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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/982,954 | 10/22/2001 | Gurtej Sandhu | M4065.0353/P353-A | 8784 |

24998 7590 09/26/2002

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| EXAMINER |
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MOORE, KARLA A

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| ART UNIT | PAPER NUMBER |
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1763

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DATE MAILED: 09/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

ms 4

Office Action Summary

Application No.

09/982,954

Applicant(s)

SANDHU ET AL.

Examiner

Karla Moore

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6-8 and 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,319,553 to McNerney et al. in view of U.S. Patent No. 5,935,334 to Fong et al.

3. McNerney et al. disclose the invention substantially as claimed, including: a multi chamber deposition apparatus (Figure 10) for processes such as atomic layer doping, where simultaneous processing of wafers in separate regions is desired (column 3, row 9). The apparatus comprises a plurality regions (column 3, row 29; Figure 10, 112, 114, 116, 118) and a centrally located loading assembly (Figure 3, 104; column 4, row 21) for moving the substrates from one region to another. The plurality of regions can be separated into two pairs of regions, so that, in each pair of regions, a first region (112 or 116) is capable of applying a first gas species and a second region (114 or 118) is capable of second processing step (column 5, row 14). If desired, the deposition regions can all be connected to the same gas supply, four independent gas supplies or multiple gas supplies. All regions are adjacent and chemically isolated from one another by an inert gas curtain of argon (Figure 10, 210; column 8, row 37).

Similar to the claimed invention, the loading assembly is capable of moving a plurality of substrates through all four of the regions sequentially or in a predefined pattern (column 5, row 5). Thus, a plurality of substrates can be treated simultaneously in respective pairs of first and second regions and then transferred to another plurality of regions.

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4. However, McInerney et al. fail to specifically teach a first atomic layer region used for deposition and a second atomic layer region used for thermal diffusion of the dopant species.

5. Fong et al. teach deposition of a dopant species in a first processing region and transfer to a second processing region, such as an annealing chamber or a rapid thermal process reactor, for the purpose of driving in the dopant atoms (column 41, row 61-column 62, row 12).

6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a first atomic layer doping region for deposition and a second atomic layer doping region for thermal treatment of the in McInerney et al. in order to diffuse the dopant species as taught by Fong et al.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over McInerney et al. and Fong et al. as applied to claims 1-4, 6-8 and 10-17 above, and further in view of U.S. Patent No. 6,056,849 to Straemke.

8. The above prior art discloses a multiple chamber deposition apparatus comprising a plurality of deposition regions that are chemically isolated from one another using an inert gas curtain of argon.

9. The prior art fails to teach a physical barrier present between adjacent deposition regions.

10. Straemke teaches the use of closeable, gas tight door (Figure 1, 12) to isolate the deposition area of a treatment chamber and discloses that multiple processing areas can be separated using the doors (column 3, row 50).

11. It would have been obvious to one skilled in the art to modify the prior art with the addition of gas tight doors as a means of physically separating the deposition regions. Addition of doors to the deposition apparatus would optimize the processing of substrates, by providing more effective isolation of adjacent chambers, resulting in decreased contamination between chambers.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over McInerney et al. and Fong et al. as applied to claims 1-4, 6-8 and 10-17 above, and further in view of U.S. Patent No. 6,207,005 B1 to Henley et al.

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13. The above prior art discloses the invention substantially as claimed, including: a multiple chamber deposition apparatus comprising two pairs of deposition regions. McInerney et al. further teach that there is no limitation as to the specific number of chambers to be used (column 3, row 26).
14. The invention of McInerney et al., fails to teach an apparatus comprising a third pair of atomic layer doping regions.
15. Henley et al. discloses a deposition apparatus comprised of 3 pairs of deposition regions (Figure 1).
16. It would have been obvious to one skilled in the art to modify the invention of McInerney et al. by adding an additional pair of deposition regions to increase the throughput of the deposition apparatus.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km
September 24, 2002


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700